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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/856,561	12/05/2001	Yin-Ming Li	1797-0160001	3573

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EXAMINER	
IBRAHIM, MEDINA AHMED	
ART UNIT	**PAPER NUMBER**
1638	

DATE MAILED: 09/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/856,561	LI ET AL.	
	Examiner	Art Unit	
	Medina A Ibrahim	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6,10,14 and 15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6,10,14 and 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Receipt is acknowledged of Applicants' response to the Advisory action mailed 05/04/04. However, upon further search and consideration, it has been determined that the finality of the rejection of the last Office action and the indicated allowability of claims 6, 10, and 14-15 have been withdrawn. This Office action contains NEW GROUNDS OF REJECTION and is made non-final. The delay in applying these new grounds of rejection is regretted.

Applicant's response filed 07/16/04 has been entered. Claims 6, 10, and 14-15 are pending and are examined.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 07/08/04 has been considered. However, the International Search Report listed as (Reference AS) in page 2 of the IDS form will not be published on the face of the patent because it is an inappropriate reference for publication on the face of the patent.

New Matter

Claims 6, 10, and 14-15 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This is a NEW MATTER rejection.

The claims recite "arable soil". However, support for the limitation "arable" cannot be found in the specification or in the claims as originally filed. The American Heritage College Dictionary defines "arable" as -- fit to be cultivated---. However,

Applicant's invention is directed to recovering the heavy metal cadmium and/or zinc from cadmium and zinc contained soil. A soil containing heavy metals cannot be arable. In fact, contaminated soil is the opposite of an arable soil. Therefore, the limitation "arable" is considered to be a new matter. Applicant is requested to point to support for the limitation in the originally filed specification or to delete the New Matter in response to this rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

At claims 6 and 10 the recitation "cadmium and/or zinc containing arable soil" is confusing. A soil containing cadmium and zinc metals is a contaminated soil and does not fit for cultivation. The specification fails to provide clear description of "arable soil" containing Cd and/or Zn. Clarification is required to more clearly define the metes and bounds of the claims.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6, 10 and 14-15 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Brown et al (Journal Of Environmental Quality, Vol. 23, pp. 1151-1157 (1994), Applicant's IDS)

The claims are drawn to a method of recovering cadmium and/or zinc from arable soil containing Cd/Zn by cultivating at least one of any *Thlaspi caerulescens* plant on said soil, wherein the plant is of the G15 genotype deposited under ATCC accession, and wherein the plant accumulates from about 100 or 1000 to about 6000 mg of Cd/kg and/or 5000 or15,000 to about 30,000 mg Zn/kg in above ground tissue (dry wt) to obtain a zinc and/or cadmium containing ore. The claims also drawn to isolated and cultivated plants and seed of said G15 genotype, seed of which have been deposited.

Brown et al teach a method for removing Zn and Cd from soil containing Cd and Zn by growing *Thlaspi caerulescens* plants in said soil, and harvesting shoot of the plant for analysis of Cd and Zn content. *Thlaspi caerulescens* plants were able to accumulate 18, 455 mg/kg of Zn and 1020 mg/Kg of Cd dry wt in the shoot without yield reduction

from three different soils (see at least the Abstract). The cited reference further teaches metal-tolerant hyperaccumulator *Thlaspi caerulescens* plants and seed (Materials and Methods on pages 1152-1153). Brown et al teach all claim limitations but do not mention the genotype G15. The examiner is unable to determine whether plant used in the prior art method is the same as the G15 *Thlaspi caerulescens* plants of the instant claims. However, according to Brown et al (on page 1151, the 2nd and 3rd full paragraphs), *Thlaspi caerulescens* plants are known Zn and Cd hyperaccumulators and have been used in phytoremediation of Zn and Cd contaminated soils before Applicant's invention. Baker et al (1994) cited in Brown et al, discovered Zn and Cd concentrations of as high as 21000 and 164 mg/kg, respectively, from the shoots of *Thlaspi caerulescens* plants growing on metal contaminated soils. The USPTO does not have sufficient facts to determine whether the respective plants used in the process are "inherently the same". The USPTO cannot conclude that the subject matter of the claim would have been obvious since it can not determine whether the plants (Applicants' G15 *Thlaspi caerulescens* plant and the plant of the prior art) employed in the method differ. The USPTO/Examiner is not in position to make either a conclusion of " inherency/anticipation" or "obviousness" since the record does not allow one to determine if and how the claimed subject matter differs from the prior art. Accordingly the burden shifts to Applicant to provide evidence that the prior art would neither anticipate nor render obvious the claimed invention. See, *In re Best* 195 USPQ 430, 433 (CCPA 1977).

Claims 6, 10 and 14-15 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Brown et al (Environmental Science and Technology (1995), vol. 29, no. 6; pp1581-1585, Applicant's IDS).

Brown et al teach Zn and Cd uptake and accumulation by *Thlaspi caerulescens* plants from soils. Brown teaches growing *Thlaspi caerulescens* plants on long-term sewage sludge plots. Zn and Cd accumulation in the shoots were measured. The plants were able to accumulate as high as 4440 mg/kg of Zn. The cited reference teaches that *Thlaspi caerulescens* plants have the ability to hyperaccumulate Zn when grown on non-contaminated and slightly contaminated soils (Results and Discussion, pages 1583-1584). Brown et al teach all claim limitations but do not mention the genotype G15. The examiner is unable to determine whether plant used in the prior art method is the same as the G15 *Thlaspi caerulescens* plants of the instant claims. However, according to the cited reference (page 1581, last full paragraph, and paragraph bridging pages 1581 and 1582), *Thlaspi caerulescens* plants are known Zn and Cd hyperaccumulators and have been used in phytoremediation of Zn and Cd contaminated soils before Applicant's invention. The USPTO does not have sufficient facts to determine whether the respective plants used in the process are "inherently the same". The USPTO cannot conclude that the subject matter of the claim would have been obvious since it can not determine whether the plants (Applicants' G15 *Thlaspi caerulescens* plant and the plant of the prior art) employed in the method differ. The USPTO/Examiner is not in position to make either a conclusion of " inherency/anticipation" or "obviousness" since the record does not allow one to determine if and how the claimed subject matter differs

from the prior art. Accordingly the burden shifts to Applicant to provide evidence that the prior art would neither anticipate nor render obvious the claimed invention. See, *In re Best* 195 USPQ 430, 433 (CCPA 1977).

Claims 6, 10 and 14-15 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Brown et al (Soil Sci. Soc. Am. J. vol. 59:123-133, 1995, Applicant's IDS).

Brown et al teach a method of using *Thlaspi caerulescens* in the phytorecovery of Cd and Zn from cadmium and zinc-contaminated media. T. *caerulescens* plants, were grown on nutrient solutions treated with various concentrations of Cd and Zn, to determine Zn and Cd accumulation and tolerance in the plants (page 126, Materials and Methods and Table 1). In one of the treatments, *caerulescens* plant s accumulated more than 25000 mg /kg of Zn and 1000 mg /Kg of Cd without effecting the plant growth and yield (see at least Results and Discussion on page 127). The reference teaches that specific genotypes of *T. caerulescens* may be strong candidates for the phytoremediation of Zn and Cd contaminated soils. The cited reference also discusses the potential use of *Thlaspi caerulescens* for phytoremediation of soils. Brown et al teach all claim limitations but do not mention the genotype G15. The examiner is unable to determine whether plant used in the prior art method is the same as the G15 *Thlaspi caerulescens* plants of the instant claims. However, according to the cited reference (paragraph bridging pages 125 and 126), *Thlaspi caerulescens* plants are known Zn and Cd hyperaccumulators and have been used in phytoremediation of Zn and Cd

contaminated soils before Applicant's invention. The USPTO does not have sufficient facts to determine whether the respective plants used in the process are "inherently the same". The USPTO cannot conclude that the subject matter of the claim would have been obvious since it can not determine whether the plants (Applicants' G15 *Thlaspi caerulescens* plant and the plant of the prior art) employed in the method differ. The USPTO/Examiner is not in position to make either a conclusion of " inherency/anticipation" or "obviousness" since the record does not allow one to determine if and how the claimed subject matter differs from the prior art. Accordingly the burden shifts to Applicant to provide evidence that the prior art would neither anticipate nor render obvious the claimed invention. See, *In re Best* 195 USPQ 430, 433 (CCPA 1977).

Remarks

No claim is allowed.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Medina A. Ibrahim whose telephone number is (571) 272-0797. The Examiner can normally be reached Monday -Thursday from 8:00AM to 5:30PM and every other Friday from 9:00AM to 5:00 PM. Before and after final responses should be directed to fax nos. (703) 872-9306 and (703) 872-9307, respectively.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Dr. Amy Nelson, can be reached at (571) 272-0804.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status

information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

9/7/04

Mai

MEDINA A. IBRAHIM
PATENT EXAMINER

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